



p:tac

AAATGAGCTG TTGACAATTA ATCATCGGCT CGTATAATGT GTGGAATTGT GAGCGGATAA
EcoRI SacI KpnISmaI
CAATTTTACA CAGGAAACAG AATTCGAGCT CGGTACCCGG GCTACATGGA GATTAAGTCA
RBS | -> α-globin
ATCTAGAGGG TATTAATAAT GTATCGCTTA AATAAGGAGG AATAACATAT GGTGCTGTCT
CCTGCCGACA AGACCAACGT CAAGGCCGCC TGGGGTAAGG TCGGCGCGCA CGCTGGCGAG
TATGGTGCGG AGGCCCTGGA GAGGATGTTT CTGTCCTTCC CCACCACCAA GACCTACTTC
CCGCACTTCG ATCTGAGCCA CGGCTCTGCC CAGGTTAAGG GCCACGGCAA GAAGGTGGCC
GACGCGCTGA CCAACGCCGT GGCGCACGTG GACGACATGC CCAACGCGCT GTCCGCCCTG
AGCGACCTGC ACGCGCACAA GCTTCGGGTG GACCCGGTCA ACTTCAAGCT CCTAAGCCAC
TGCCTGCTGG TGACCCTGGC CGCCCACCTC CCCGCCGAGT TCACCCCTGC GGTGCACGCC
->|
TCCCTGGACA AGTTCCTGGC TTCTGTGAGC ACCGTGCTGA CCTCCAAATA CCGTTAAACT
RBS | -> β-globin
AGAGGGTATT AATAATGTAT CGCTTAAATA AGGAGGAATA ACATATGGTG CACCTGACTC
CTGAGGAGAA GTCTGCCGTT ACTGCCCTGT GGGGCAAGGT GAACGTGGAT GAAGTTGGTG
GTGAGGCCCT GGGCAGGCTG CTGGTGGTCT ACCCTTGGAC CCAGAGGTTC TTTGAGTCCT
TTGGGGATCT GTCCACTCCT GATGCTGTTA TGGGCAACCC TAAGGTGAAG GCTCATGGCA
AGAAAGTGCT CGGTGCCTTT AGTGATGGCC TGGCTCACCT GGACAACCTC AAGGGCACCT
TTGCCACACT GAGTGAGCTG CACTGTGACA AGCTGCACGT GGATCCTGAG AACTTCAGGC
β108Asn->Gln
TCCTGGGACA AGTACTGGTC TGTGTGCTGG CCCATCACTT TGGCAAAGAA TTCACCCAC
CAGTGCAGGC TGCCTATCAG AAAGTGGTGG CTGGTGTGGC TAATGCCCTG GCCCACAAGT
->|SphI rrB(5S, T1, T2)
ATCACTAAGC ATGCATCTGT TTTGGCGGAT GAGAGAAGAT TTTGAGCCTG ATACAGATTA
NsiI

FIG 1A



p: tac

.....

AAATGAGCTG TTGACAATTA ATCATCGGCT CGTATAATGT GTGGAATTGT GAGCGGATAA
EcoRI SacI KpnISmaI
CAATTTTACA CAGGAAACAG AATTCGAGCT CGGTACCCGG GCTACATGGA GATTAACTCA
RBS | -> α-globin
ATCTAGAGGG TATTAATAAT GTATCGCTTA AATAAGGAGG AATAACATAT GGTGCTGTCT
CCTGCCGACA AGACCAACGT CAAGGCCGCC TGGGGTAAGG TCGGCGCGCA CGCTGGCGAG
TATGGTGCGG AGGCCCTGGA GAGGATGTTC CTGTCTTCTT CCACCAACCA GACCTACTTC
CCGCACTTCG ATCTGAGCCA CGGCTCTGCC CAGGTTAAGG GCCACGGCAA GAAGGTGGCC
GACGCGCTGA CCAACGCCGT GCGCACGTG GACGACATGC CCAACGCGCT GTCCGCCCTG
AGCGACCTGC ACGCGCACA GCTTCGGGTG GACCCGGTCA ACTTCAAGCT CCTAAGCCAC
TGCCTGCTGG TGACCCTGGC CGCCCACCTC CCCGCCGAGT TCACCCCTGC GGTGCACGCC
TCCCTGGACA AGTTCCTGGC TTCTGTGAGC ACCGTGCTGA CCTCCAAATA CCGTTAAACT
RBS | -> β-globin
AGAGGGTATT AATAATGTAT CGCTTAAATA AGGAGGAATA ACATATGGTG CACCTGACTC
CTGAGGAGAA GTCTGCCGTT ACTGCCCTGT GGGGCAAGGT GAACGTGGAT GAAGTTGGTG
GTGAGGCCCT GGGCAGGCTG CTGGTGGTCT ACCCTTGGAC CCAGAGGTTT TTTGAGTCCT
TTGGGGATCT GTCCACTCCT GATGCTGTTA TGGGCAACCC TAAGGTGAAG GCTCATGGCA
AGAAAGTGCT CGGTGCCTTT AGTGATGGCC TGGCTCACCT GGACAACCTC AAGGGCACCT
TTGCCACACT GAGTGAGCTG CACTGTGACA AGCTGCACGT GGATCCTGAG AACTTCAGGT
β105Leu->Trp
GGCTAGGCAA CGTGCTGGTC TGTGTGCTGG CCCATCACTT TGGCAAAGAA TTCACCCAC
CAGTGCAGGC TGCCTATCAG AAAGTGGTGG CTGGTGTGGC TAATGCCCTG GCCCACAAGT
->|SphI rxB(5S,T1,T2)
ATCACTAAGC ATGCATCTGT TTTGGCGGAT GAGAGAAGAT TTTCAGCCTG ATACAGATTA
NsiI
.....

FIG 1B

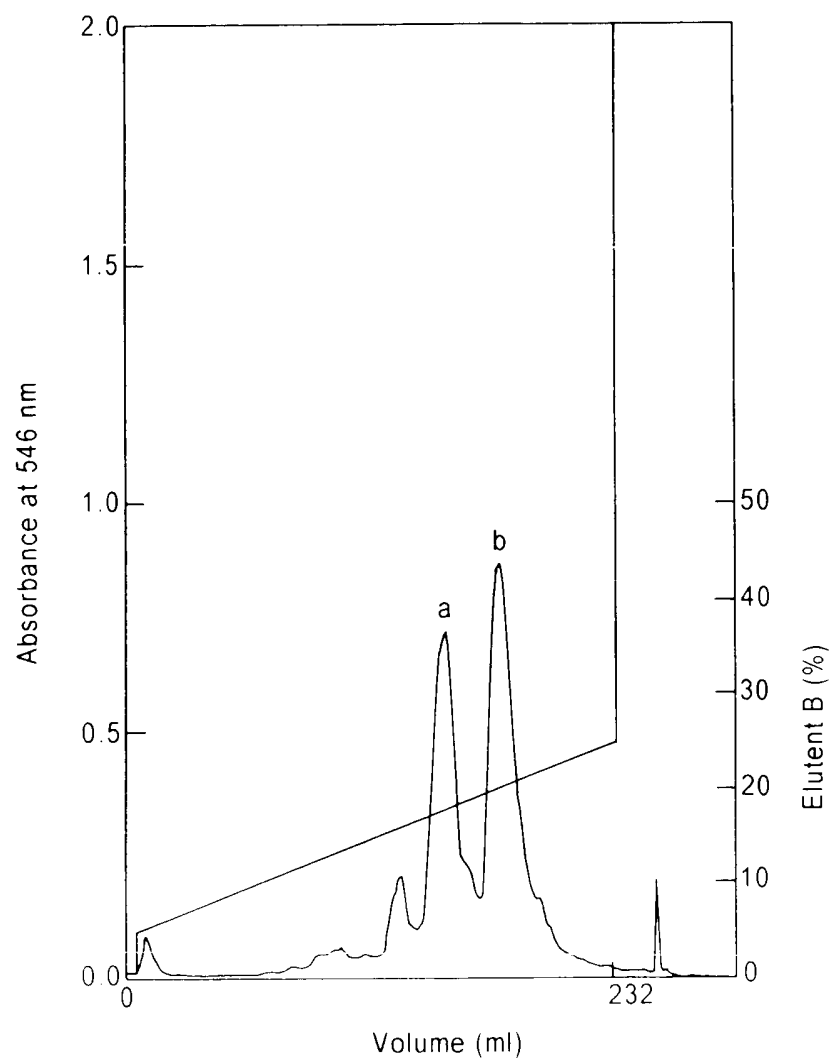


FIG. 2A

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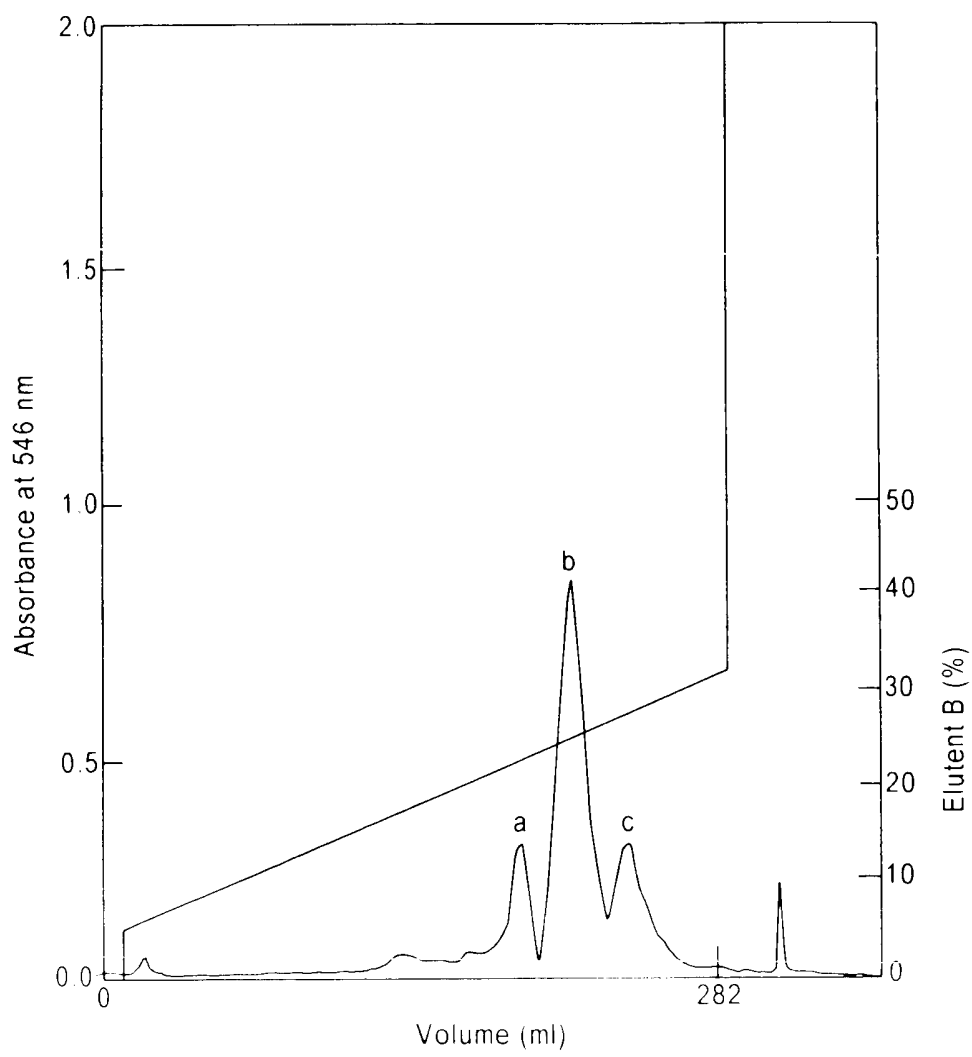


FIG. 2B

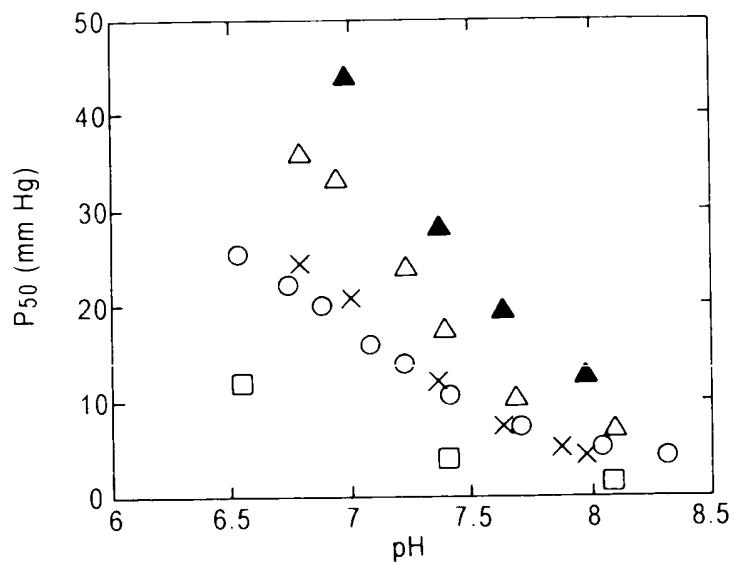
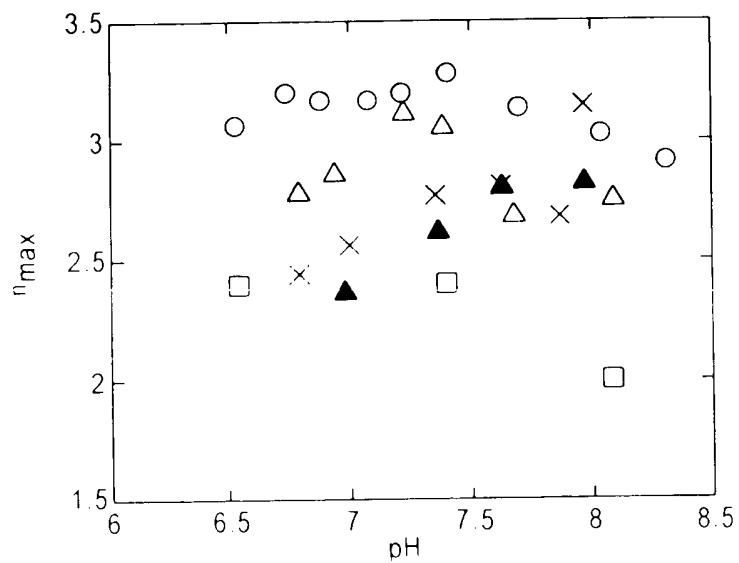


FIG. 3A



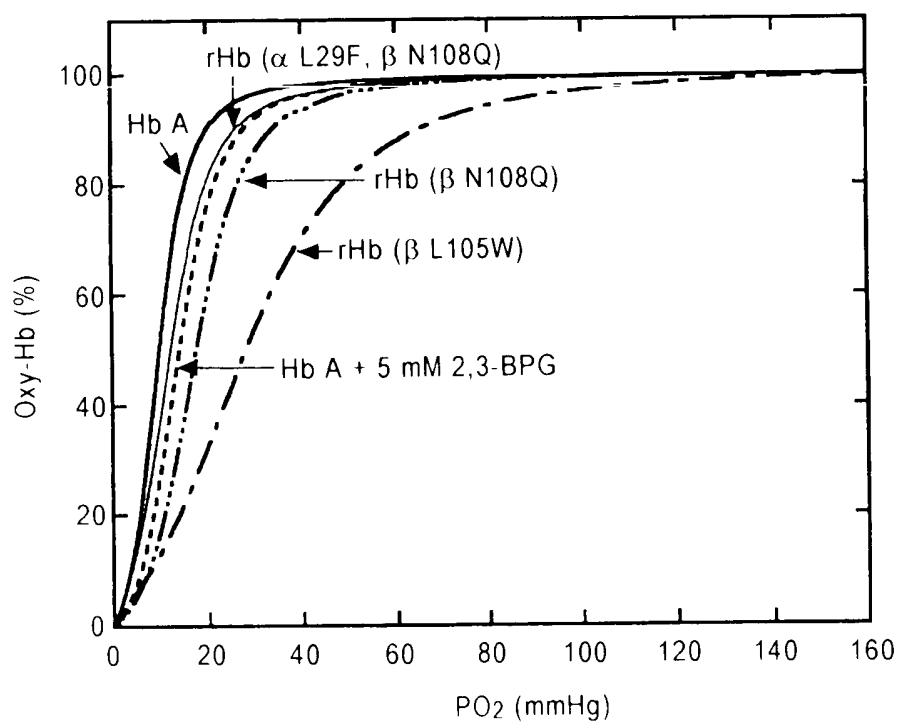


FIG. 4

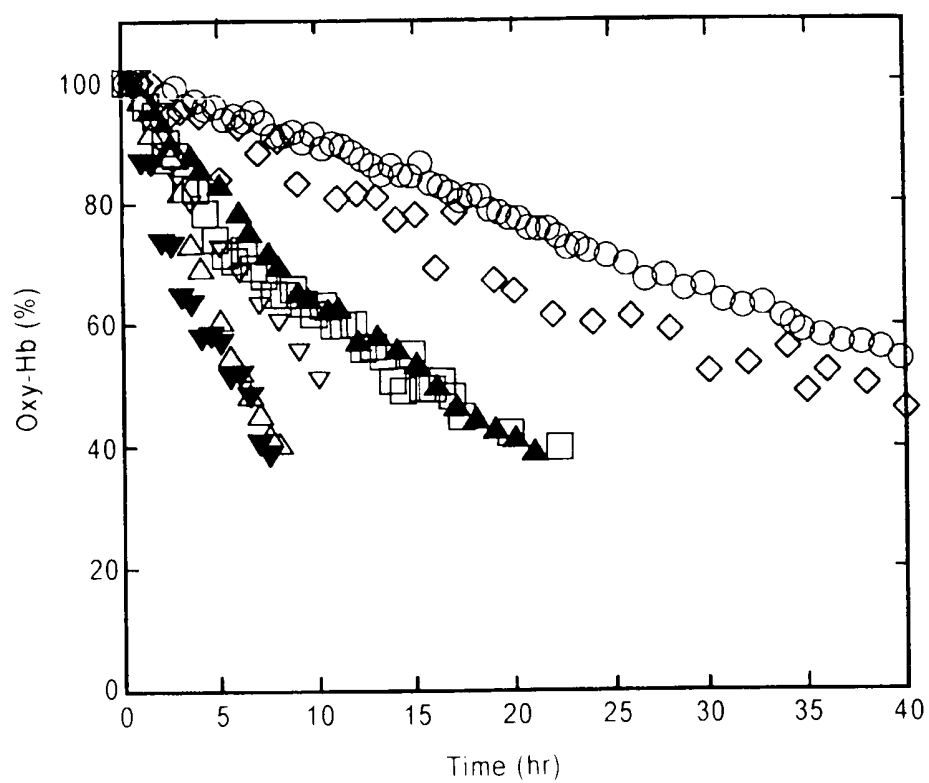


FIG. 5

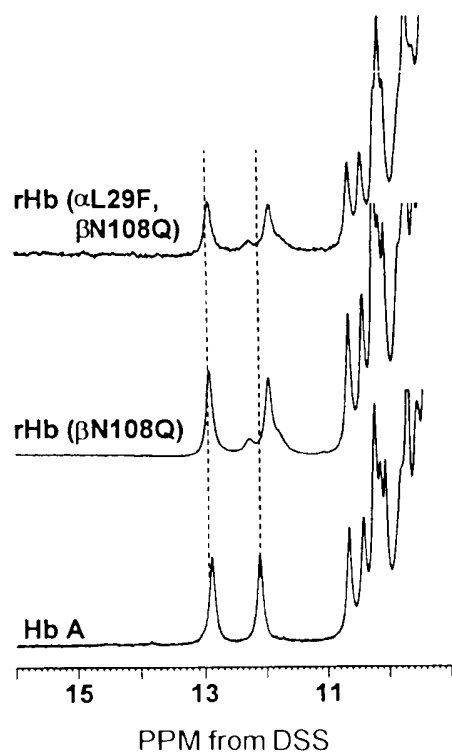


FIG. 6A

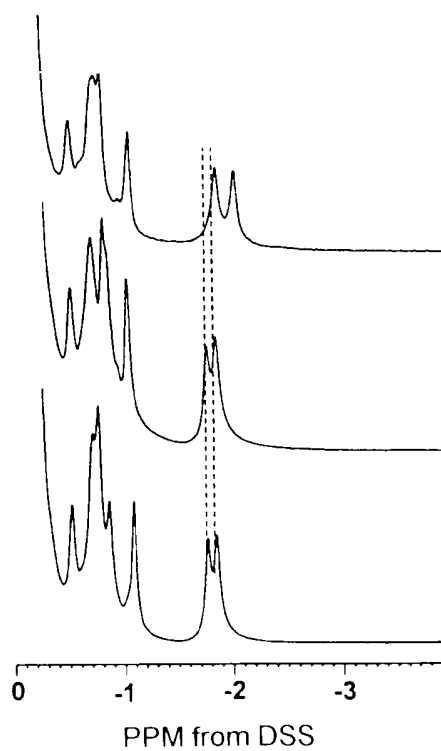


FIG. 6B

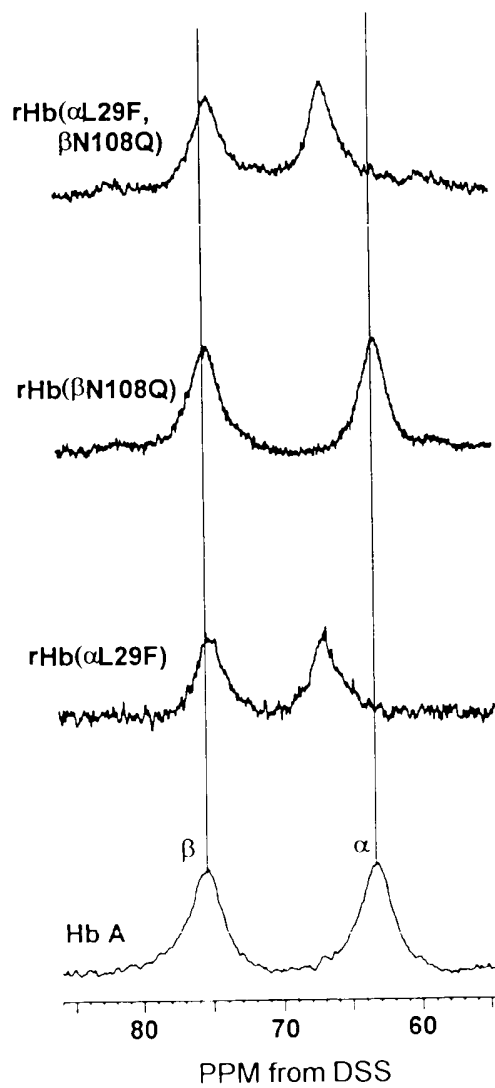


FIG. 7A

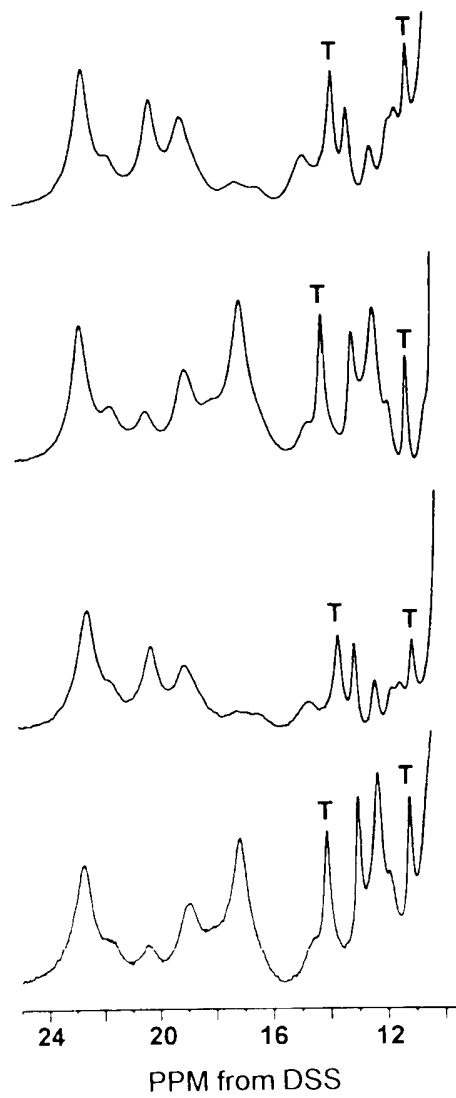


FIG. 7B

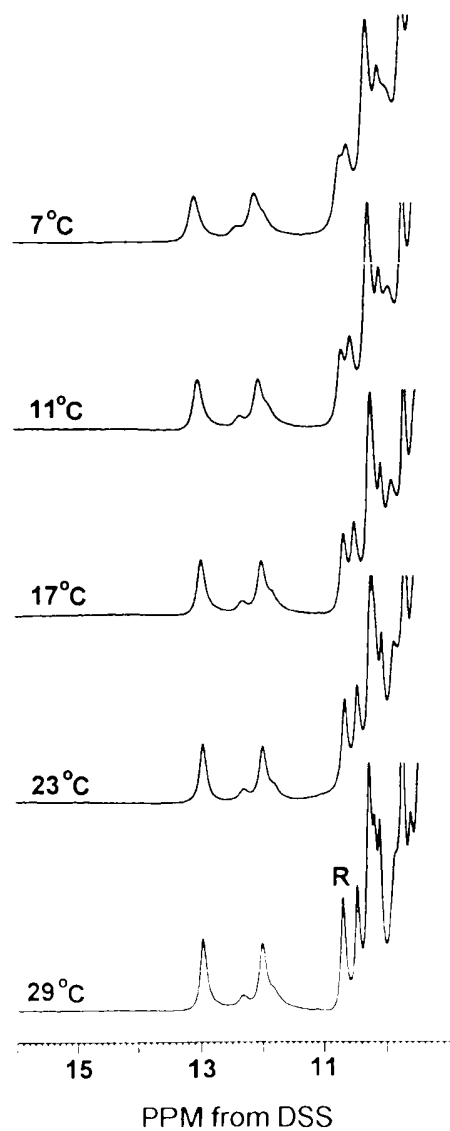
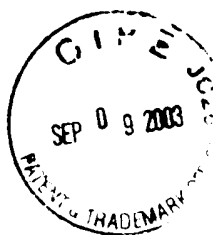


FIG. 8A

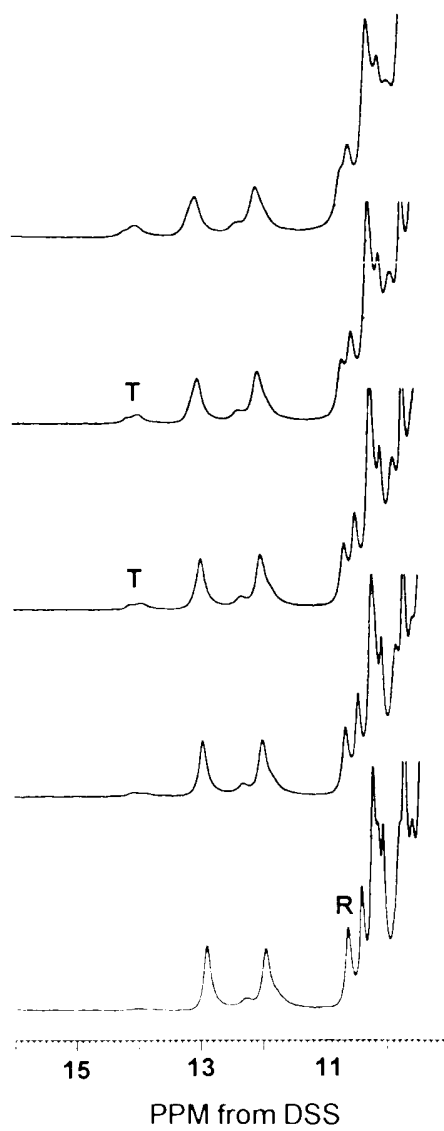


FIG. 8B

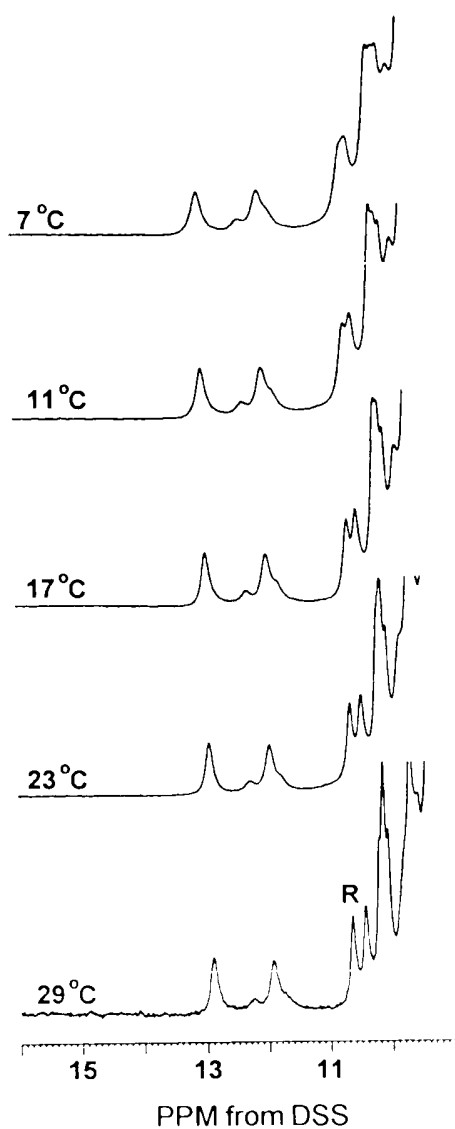


FIG. 9A

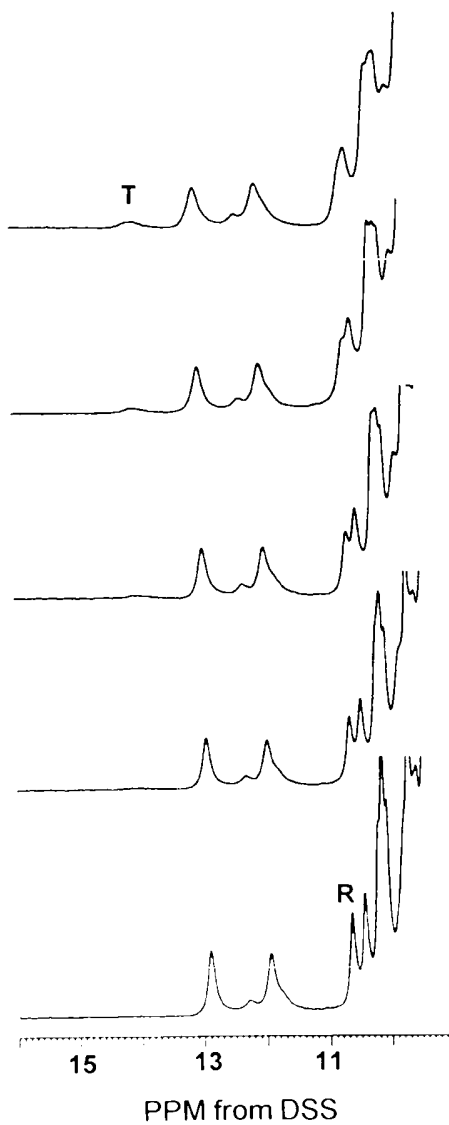


FIG. 9B

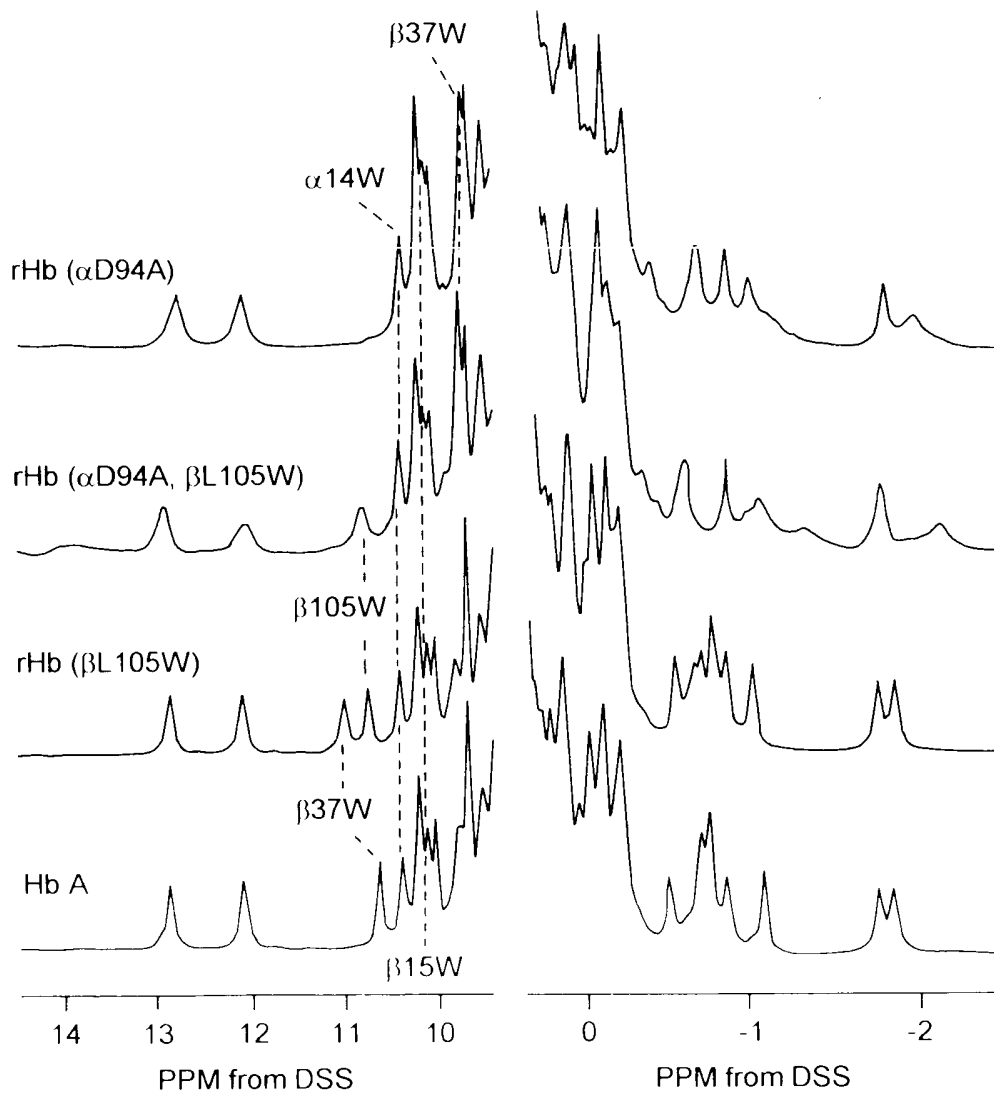


FIG. 10A

FIG. 10B



FIG. 11A

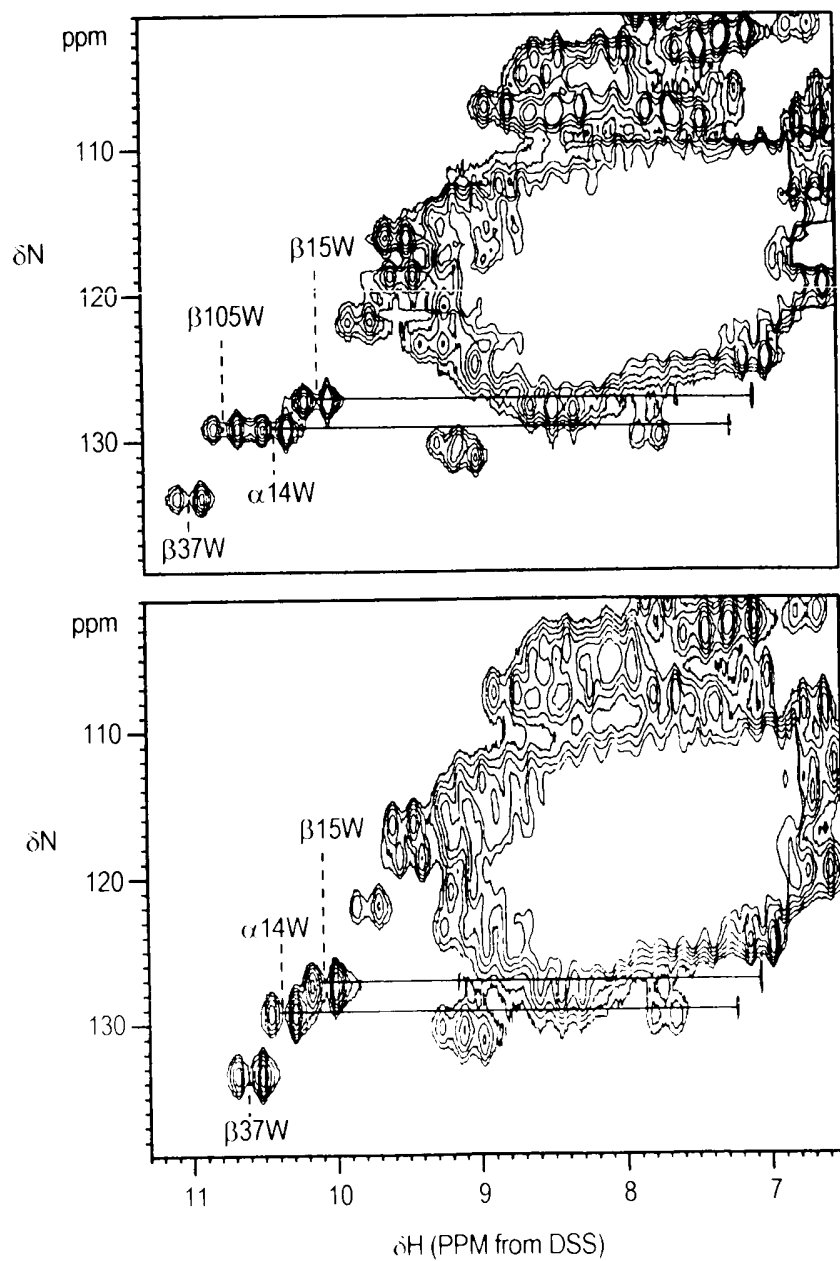




FIG. 12A

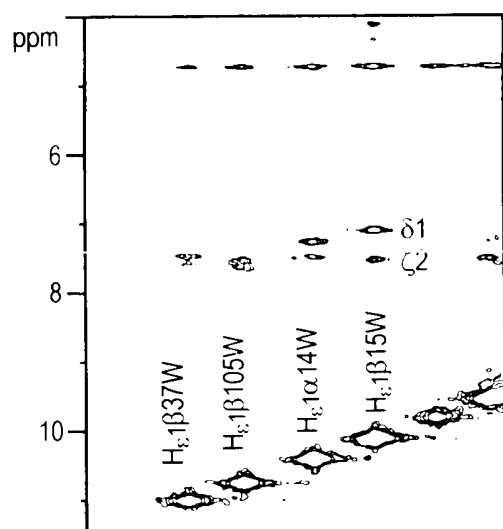
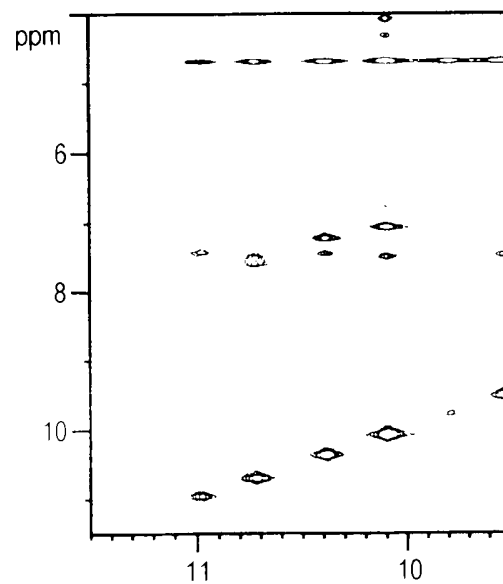
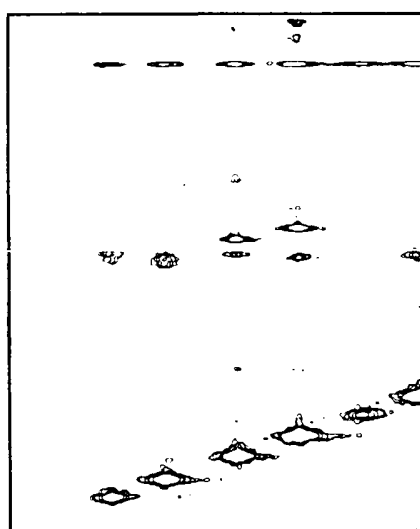
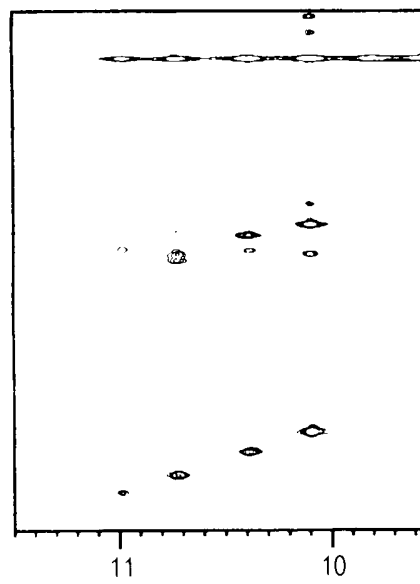


FIG. 12B



PPM from DSS

FIG. 12C



PPM from DSS

FIG. 12D

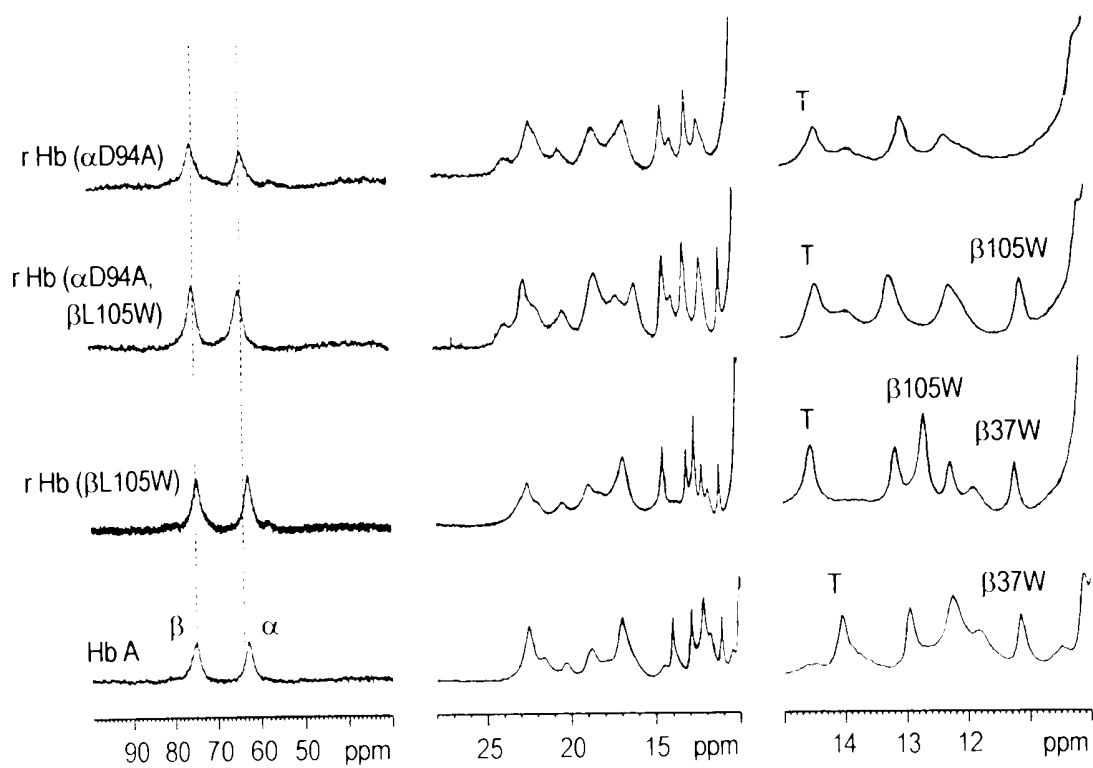


FIG. 13A

FIG. 13B

FIG. 13C

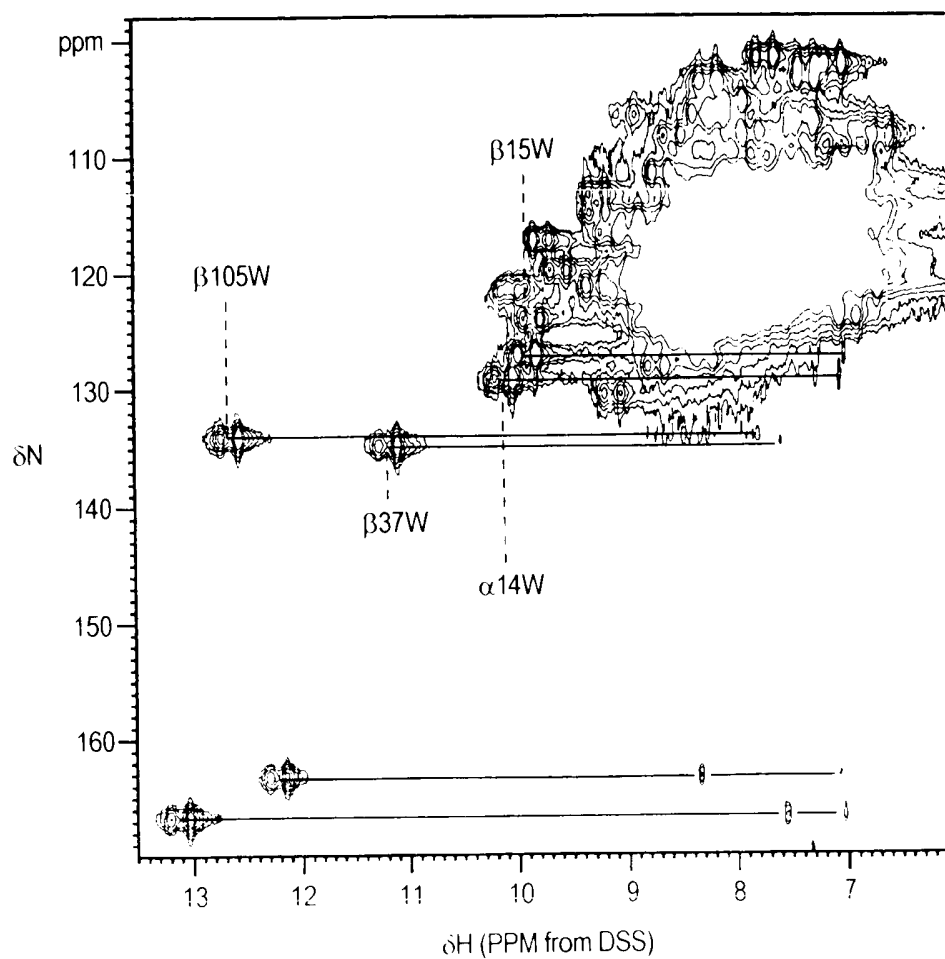


FIG. 14



FIG. 15A

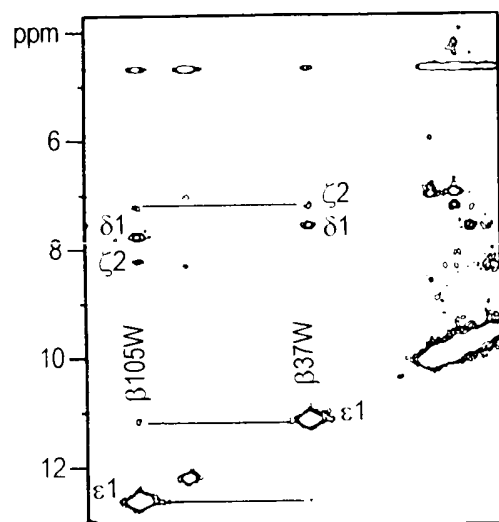


FIG. 15B

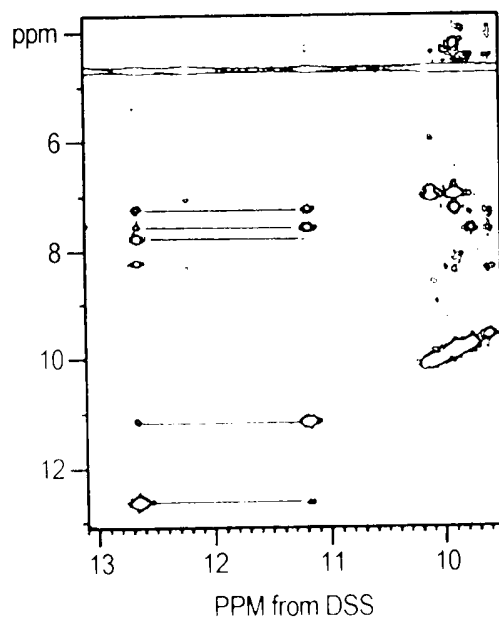
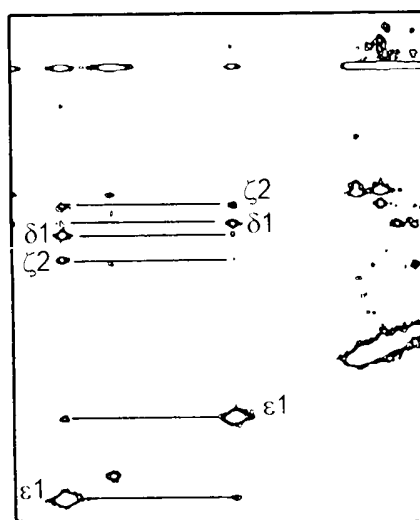


FIG. 15C

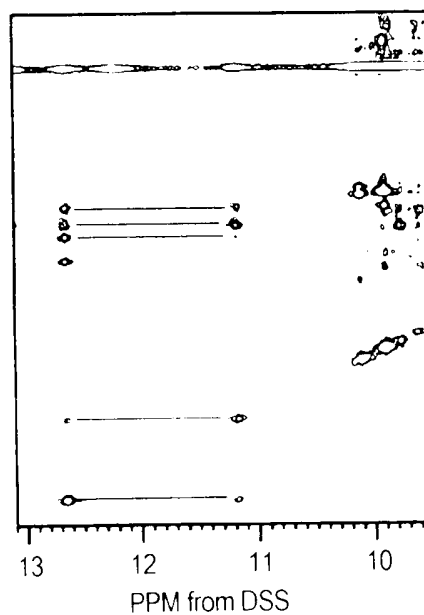


FIG. 15D

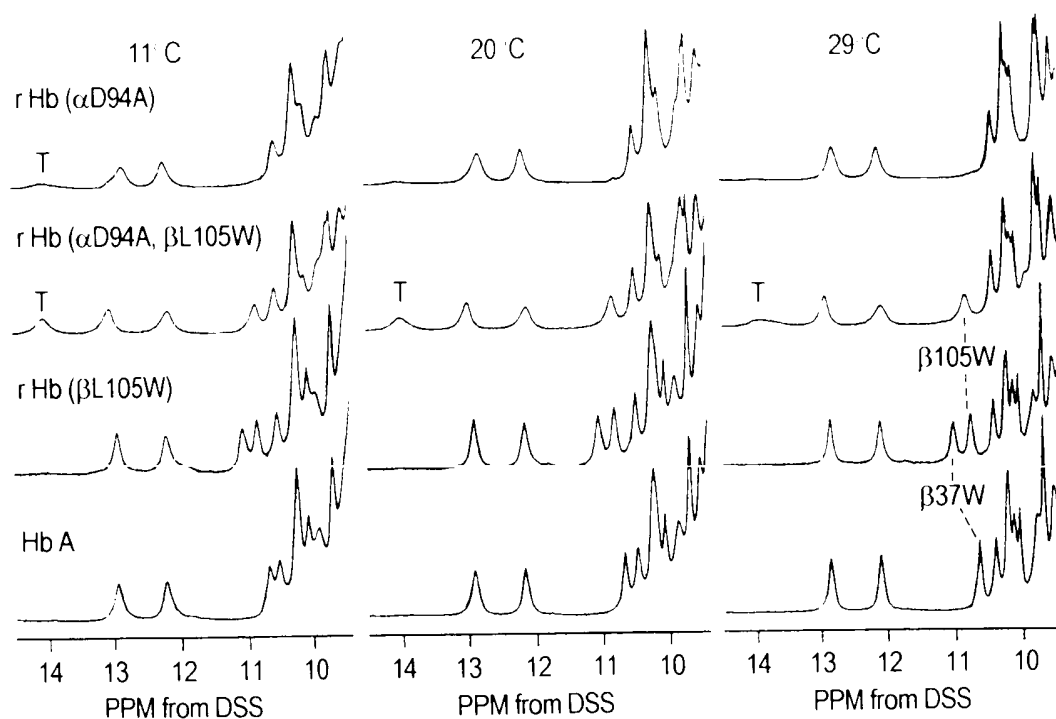


FIG. 16A

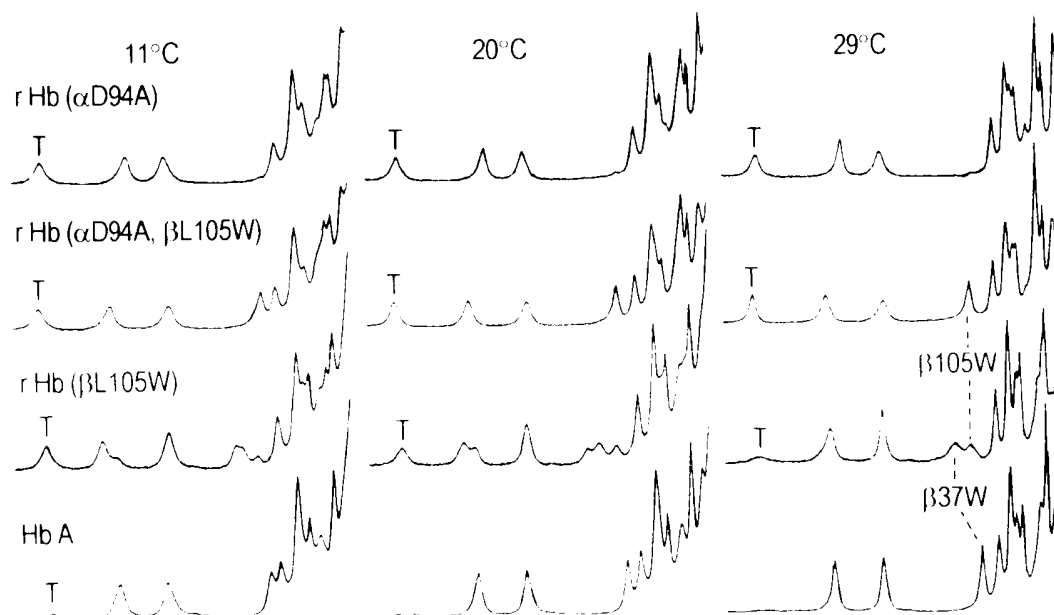


FIG. 16B

FIG. 17A

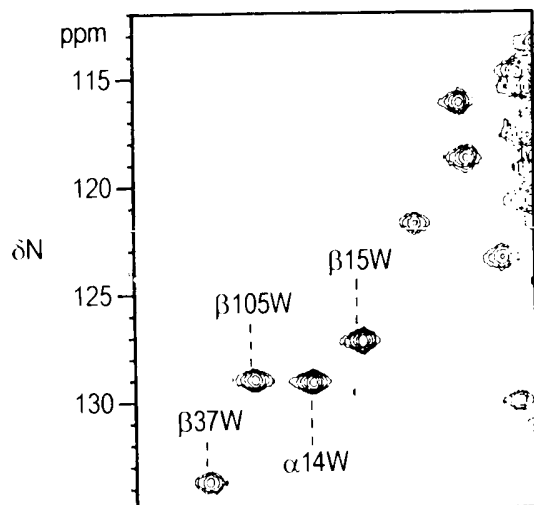


FIG. 17B

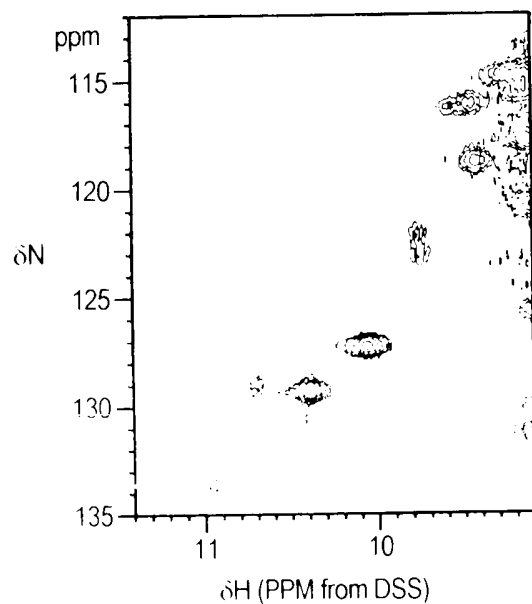
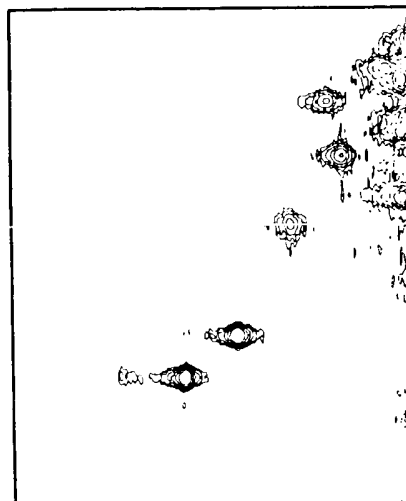


FIG. 17C

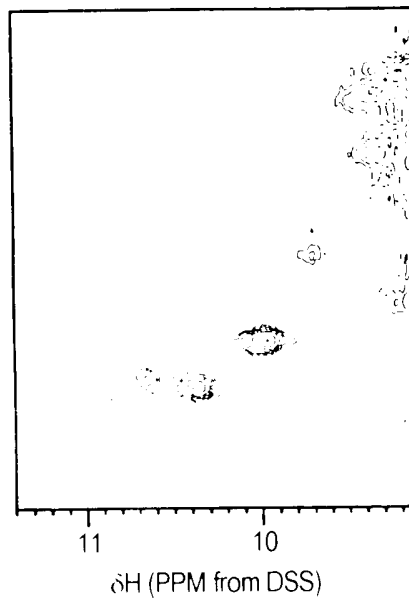


FIG. 17D

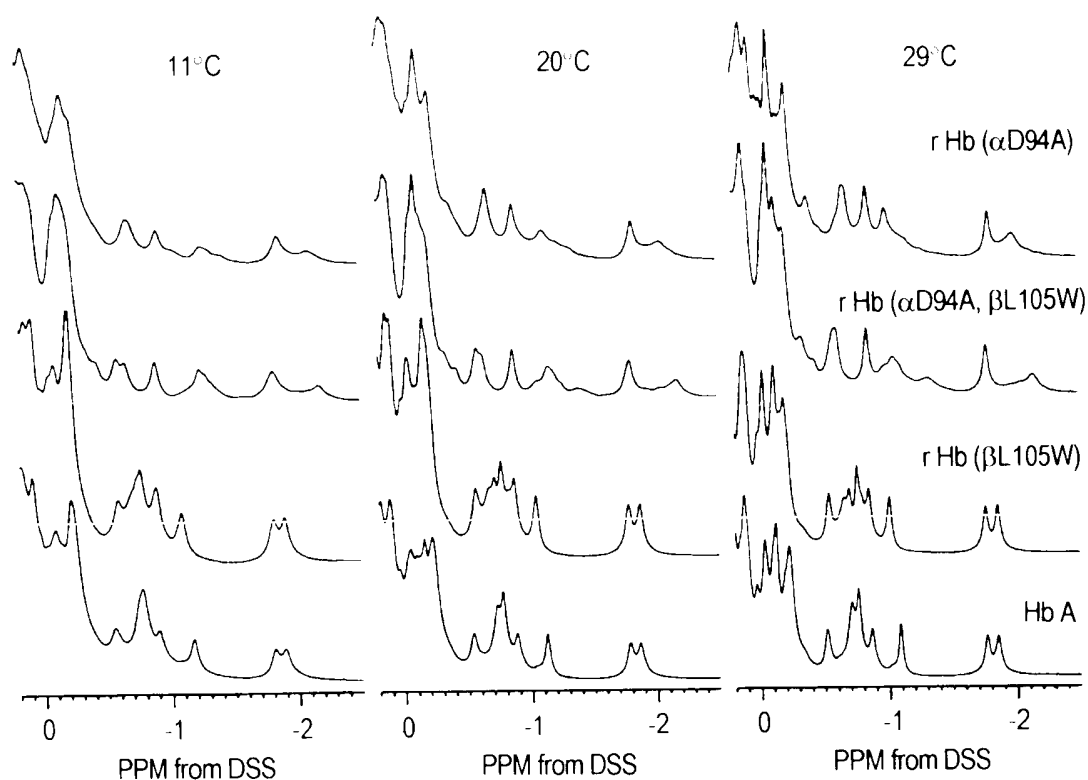


FIG. 18A

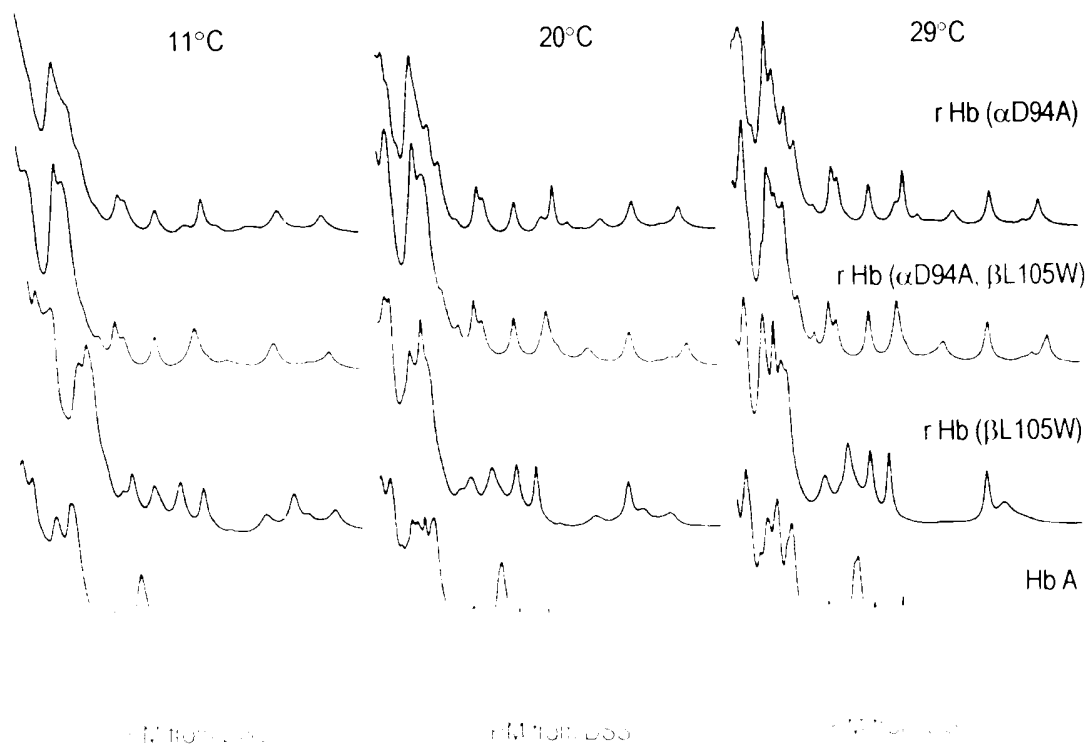


FIG. 18B